NOTE: This format has been taken from *USC Title 42 Chapter 99* (OTEC) and modified for the placement of wind turbine generators in the ocean. This same format can be used as a template for the placement of other alternate energy production devices for placement on the OCS.

ENVIRONMENTAL ASPECTS OF WIND POWER
WIND GENERATION IN THE FEDERAL COASTAL ZONE

ENVIRONMENTAL IMPACT STATEMENT

The issuance of any license for ownership, construction, and operation of an open ocean windmill farm shall be deemed to be a major Federal action significantly affecting the quality of the human environment. For all timely applications covering proposed facilities in a single application area, and for each application relating to a proposed open ocean windmill farm, the "Lead Federal Agency" "MMS" shall, in cooperation with other involved Federal agencies and departments, prepare a single scope for the preparation of an environmental impact statement.

This scope shall fulfill the requirements of all Federal agencies in carrying out their responsibilities pursuant to the preparation an environmental impact statement. Each such draft environmental impact statement relating to proposed facilities shall be prepared and published within 180 days after notice of the initial application has been published. Each final environmental impact statement shall be published not later than 90 days following the date on which public hearings are concluded. The "Lead Federal Agency" may extend the deadline for publication of a specific draft or final environmental impact statement to a later specified time for good cause shown in writing

HAZARD U.S. COAST GUARD AIDS TO NAVIGATION – NEPA

- Marine environmental protection and safety of life and property at sea
- Coast Guard operations
- Promotion of safety of life and property
- Marking components for protection of navigation
- Safety zones
- Protection of navigation

DESCRIPTION OF THE PROPOSED ACTION

PROJECT PURPOSE AND NEED

DESCRIPTION OF THE PROPOSED PROJECT

The applicant must provide a complete description of the Proposed project.

BACKGROUND AND HISTORY

The applicant is required to provide a complete background and history of the project.

PUBLIC NEED FOR THE PROJECT AND COMMUNITY OBJECTIVES BASED ON ADOPTED COMMUNITY DEVELOPMENT PLANS (E.G., LOCAL WATERFRONT REVITALIZATION PLAN, ETC.)

The applicant is required to show that the project is in compliance with the local development plans.

The applicant is required to show the need for economic growth that will result in increased employment.

The applicant is required to show that the project conforms to the need for attracting clean industries.

1. The applicant must explain in detail how they intend to involve the public and raise awareness on all levels to the scope of the project.

2. The applicant is required to submit the local address of their office The applicant is required to submit a plan showing how they will inform the public of their project this plan must include media, a toll free number and presentations to local civic groups. The applicant is required to set up community advisory groups and scheduled meetings.

OBJECTIVES OF THE PROJECT SPONSOR

1. The applicant is required to submit a modified business plan with the environmental impact statement. The plan must include the following:
    - Executive Summary
    - Market Analysis
    - Officers, and Office Locations

The applicant is required to show how they intend to insure the operation and post the necessary environmental bonds.

- Property and casualty insurance
- Liability insurance
- Environmental bonds

LOCATION OF AQUATIC AND LAND BASED OPERATIONS

Applicant is expected to provide site specific information on how the site was selected in consideration of the following criteria:

Establish geographic boundaries of the project and identify:

- Political jurisdictions (use of regional and local scale maps is recommended)
- Submerged objects, such as wrecks and pipelines/cables should be identified.
- Protection of submarine electric transmission cables and equipment.
- Landside access point(s) for operating and maintaining structures and facilities.
- Water column wind farm site
- Navigable waters/channels
- Historic sites nearby

DESIGN, ENGINEERING AND CONSTRUCTION OF AQUATIC AND LAND BASED FACILITIES:

AQUATIC STRUCTURES AND AREA COVERED.

This section is intended to provide accurate plans depicting all proposed structures.

- Single wind turbine schematic - Plan view, with dimensions, materials, and labels, etc.
- Single wind turbine schematic - Cross section, with dimensions, materials, and labels, etc.
- Total wind turbine field schematic - Plan view
- Provide dimensions, materials, and labels, etc.
- Total wind turbine field system schematic - Cross Section, provide dimension, mooring connections, labels, etc.
- On-site structures
- Describe structures such as barges, sheds, etc., to be located on-site. Provide dimensions, drawings, materials, etc.
- Describe the storage and use of oil, gasoline or other toxic or hazardous material for the operation:
- Describe the type and location of any sanitary facility
- Mooring plan - Cross section
    a. Provide a schematic and description of materials of the mooring system in place on the sea floor. Include depths from support pilings from the sea floor relative to MLW and MHW.
- Mooring system adequacy

a. Provide a schematic of the mooring array for the turbine system and a description of its ability to withstand severe storms, surge, and equipment break-up, etc. Include dimensions and materials.

- Wind turbine systems and mooring array schematic - Maximum structure array: Provide a schematic of the maximum area to be utilized by wind turbines systems and moorings on the proposed lease.
- Describe the pylon installation procedures.

DESCRIPTION OF LAND USE RIGHTS:

In this section, justify your proposal to secure exclusive lease rights over an area heretofore held in the public trust.

Justification of Lease Rights (Water Column Lease): It is generally perceived that all waters are held in public trust. The applicant must show that this action complies with the Coastal Zone Management Plan (CZMP) of the state where the cable will make landfall.

RECORD KEEPING REQUIREMENTS, AND LICENSE REQUIREMENTS

- Record keeping and public access to information
- Records and reports
- Confidential information
- License for ownership, construction, and operation of ocean thermal energy conversion facilities or plantships. License requirement:
    1. Facilities located in territorial sea; facilities connected to United States by pipeline or cable.
    2. License issuance prerequisites
        a. Issuance conditions; written agreement of compliance; disposal or removal requirements
        b. License transfer
        c. License eligibility
        d. License term and renewal.
- Rules and regulations
        a. Site evaluation and pre-construction testing
        b. Expertise or statutory responsibility descriptions
        c. Application
        d. Area description; additional license applications
        e. Copies of application to other agencies
        f. Notice, comments, and hearing

CONFIDENTIAL INFORMATION

The applicant is required to list all information that will be confidential in nature for protection of the applicant as far as trade secrets or unfair competitive advantage.

OPERATIONS

This overall proposed project requires operational supervision. The list of operations that require special attention includes, but are not limited to, the following:

1. Type of operation: Movement of personnel and supplies by vessel to the wind farm site (include type of equipment, number of vessels, duration, timing)
2. Schedule of operations, i.e., security, maintenance, etc.
    - Applicant should address in detail all aspects of the operation, daily, weekly, and monthly maintenance of all of the towers, turbines, electrical interconnection(s) and schedule vessel maintenance.
3. Estimate the amount of energy produced over 12 months at start-up and at maximum production
4. Disposal of waste materials
5. Discuss site and operations security provisions

DISASTER RESPONSE AND NOTIFICATION PROCEDURE

It is difficult to predict the complete listing of all of the emergencies or disasters that might occur. The most potential ones would include Hurricane or severe storm that damages the turbines, including aids to navigation. Address the loss or collision of vessels due to mechanical break down, storms, or weather conditions. The applicant is required to list its response to personnel injury, or injury to the public.

The applicant is required to list an emergency plan and a notification chart for all levels of government local, county, state, and federal.

The applicant is required to address a notification procedure for endangered species, sightings, entrapments, etc.

BASE LINE FIELD SURVEY

Baseline field studies required prior to approval of wind farm sites to determine the site's suitability for the placements of structures in the water column.

- Underwater: Identify the site, by size, latitude and longitude in minutes and seconds.
- Siting restrictions in areas sensitive to organic enrichment such as those with low current and poor flushing and those that are important as spawning and nursery areas for fish including salt marshes and areas with eelgrass beds. The applicant is required to show that the site does not infringe upon these areas.

- Annual monitoring of water quality, sediment composition and benthic infauna after operation begins to determine if the wind farm has had an effect on the surrounding environment.
- Description of the location of the proposed lease tract.
- An environmental evaluation of the site (Site Review) that includes: tide levels, current speed, bottom characteristics, physical and chemical characteristics of the water column and inventory of existing flora and fauna.

INTRODUCTION

DIVER SURVEY

The applicant is required to conduct a diver survey of the proposed tract prior to the placement of the turbines and submit a report with the date, and times of the diver survey, to characterize the seafloor prior to the placement or the pylons.

HYDROGRAPHY

Objective: To measure current speed and direction; to predict impacts associated with construction and operation of the wind field system. Samples should be sufficient to adequately characterize the currents fields present in the area.

Methods: The current shall be measured at three depths: surface, mid level and bottom (one meter (3 feet) off the ocean floor). Collect a 15-minute sample at each of the three depths every hour for a continuous period of 12 hours. This represents one tidal cycle. Sampling should include a Spring or full moon tidal cycle.

Subsurface current meters or acoustic Doppler profiling is preferred. However, flow meters may be used with concurrent direction. Please provide the current data in a tabular format and include the date and tide predictions for that day.

WATER QUALITY

The EPA has set forth regulations regarding the quality of the surface and ground waters. of New York State. The water quality regulations delineate several parameters, which apply to all saline surface waters.

The Applicant will be required to show the following at the site that is selected:

- Seasonal variation
- Water use classification
- Physical and chemical characteristics (turbidity, depth, current velocity, chemical analysis, temperature, flow patterns, tidal ranges, vertical profiles of temperature, salinity, dissolved oxygen)

BENTHIC ANALYSIS

Objective: To establish baseline reference data by which future impacts to the existing benthos can be measured.

Methods: The applicant must prepare a sediment-sampling plan which includes the number and location of sediment samples to be collected for grain size, chemical and biological analysis. Single sediment cores must be collected in an array of samples representative of bottom characteristics of the site.

Grain size analyses should be performed using the Wet Sieving methods described in Buchenan (1984) pp. 47-48Z) or similar procedure. The standard sieve sizes for gravel, sand, silt and clay shall be used. Full analyses of the silt clay fractions may be calculated as the difference in dry weight between the original sample and the sum of the sieve fractions down to the 0.062 mm sieve (very fine sand). The fraction in each sieve shall be reported in grams (dry weight), including the total dry weight of the initial sample. The unconsolidated material and the top 2 cm of inorganic sediments shall be collected for the analysis of TOC. The applicant must insure that a minimum of 30 grams is collected for analysis. Multiple cores (which include the top 2 cm of inorganic material) if warranted, will be required.

Total organic carbon shall be analyzed using the methods described in the Puget Sound Estuary Program (1986), Hedges and Stern (1984) or Verado et. al. (1990).

1. Benthos

    a. List benthic species on the project site and within surrounding area.
    b. Discuss benthic population (include both descriptive and statistical analysis)
        - species present and abundance
        - distribution
        - dominance
        - protected, rare and endangered species
    c. Benthic Infauna

TEMPLATE

COMMON NAME	SCIENTIFIC NAME	PRESENT	ANIMALS
Round worm	Class Nematoda	6	12

INFAUNA

Objective: To establish reference data of existing benthic infauna prior to placing Wind turbines in the column. In this way future changes to the infauna can be assessed.

Methods: Infauna samples shall be sieved through a 0.5 mm sieve (collection techniques are presented with metric measurements) and organisms identified to species or to the lowest practical taxonomic level. Single cores collected according to the proposed sampling plan along the axis of the current. Cores must be inserted to resistance or 15 cm, or whichever is less. Depth of the core shall be reported. Individual benthic infauna cores collected by a diver shall have an

area of at least 81cm^2 (a four-inch diameter PVC pipe core sample will suffice). Alternatively, cores may be collected from a grab or box type corer having an area of at least 0.1m^2 (1000 cm^2). If sub samples are taken from a grab box type corer for the sediment analysis and the remaining sample used for infauna analysis, no more than one quarter of each sample may be removed for the sediment analysis.

Aquatic ecology:

Vegetation: describe presence and amount each type.

- Shellfish, Fish, and Wildlife: List shellfish, crustaceans and other invertebrate and wildlife species on the project site and within the surrounding area, including migratory and resident species

INVERTEBRATE SPECIES OCCURRENCE AT THE WATER COLUMN SITE
KNOWN TO BE PRESENT

TEMPLATE

COMMON NAME	SCIENTIFIC NAME	OCCURRENCE
Moon jelly	Aurelia aurita	Spring-summer

FINFISH SPECIES OCCURRENCE AT THE WATER COLUMN SITE
KNOWN TO BE PRESENT

TEMPLATE

COMMON NAME	SPECIES NAME	OCCURRENCE
Permit fish	Trachinotus falcatus	Summer (young)

SEA TURTLE SPECIES OCCURRENCE AT THE WATER COLUMN SITE
KNOWN TO BE PRESENT

[Same format as above]

SEA MAMMAL SPECIES OCCURRENCE AT THE WATER COLUMN SITE
KNOWN TO BE PRESENT

[Same format as above]

AVIAN SPECIES OCCURRENCE AT THE WATER COLUMN SITE
KNOWN TO BE PRESENT

[Same format as above]

ENVIRONMENTAL SETTING OF WATER AND LAND BASED OPERATIONS FOR ALL SITES

GEOLOGY

SUBSURFACE/SURFACE

- List of sediment types
- Sediment characteristics
- Distribution of sediment types
- Suitability for proposed use
- Replenishment rates, patterns and relationship to erosion rates in project sites and adjacent areas.
- Will the project remove natural barriers and thus increase beach erosion, storm damage or navigation channel cave-ins?

HABITAT

- Describe the existing habitat and the habitat upon completion of the project
- Other:
    - Air Resources - discuss seasonal variation and air quality
    - Aesthetics
    - Cultural Resources/Community Impacts - list and describe those that may be affected

WATER COLUMN WIND FARM SITE

TOPOGRAPHY

- Description of all project sites
- Description of surrounding areas
- Description patterns and contours, shoals and deeps

HYDRODYNAMIC/OCEANOGRAPHY

For example: wave energies; current velocities and directions; wave climate; tidal amplitudes, etc.

- Wave Data: Occurrence of wave heights in meters and feet. Percent of occurrence by month and year.

- Occurrence of wave periods from 3 to 14 seconds in second intervals. Percent of occurrence by month
- Wave fetch
- Current velocity
- Wind data – Occurrence of wind speed in meters per second and miles per hour

IDENTIFICATION OF EXISTING USES AND LEVELS OF USE FOR EACH WIND FARM SITE

- recreational - boating, sport fishing, etc.
- commercial fishing, shell fishing
- transportation and military maneuvers
- review compatibility with adjacent upland areas

CLOSURE AND POST CLOSURE PLANS

Discussion to include: project termination, structure facilities at two (2) locations, as follows: These plans would involve removal, etc.

- Water column wind farm site restoration, including removal of underwater cables.
- Shore side marina facilities
- The applicant is required to detail how they intend to remove and dispose of the assets (The wind turbines, pylons, cabling and support facilities) and dispose of the hazardous material

SIGNIFICANT ENVIRONMENTAL IMPACTS

Identify all aspects of the environmental setting that may be adversely or beneficially affected by the proposed action. Include short and long term affects and primary, secondary and cumulative impacts (e.g., water quality, fisheries, habitat, access, compatibility with multiple users).

MITIGATION MEASURES TO MINIMIZE ENVIRONMENTAL IMPACT

Describe measures to reduce or avoid potential adverse impacts identifies in Section IX (e.g., water quality, fish waste, habitat, size of excavation/dredging, monitoring, method of operation, closure plans, release programs). Include economic benefits.

ADVERSE ENVIRONMENTAL EFFECTS THAT CAN NOT BE AVOIDED IF PROJECT IS IMPLEMENTED

Identify those adverse environmental effects that can be expected to occur regardless of the mitigation measures considered (e.g., effect on habitat, water quality, currents substrate, topography, fisheries, public use, etc.).

ALTERNATIVES

This section contains categories of alternatives with examples. Discussion of each alternative should be at a level sufficient to permit a comparative assessment of costs, benefits, and environmental risks for each alternative. It is not acceptable to make simple assertions that a particular alternative is not feasible.

ALTERNATIVE SITES

- Suitability of alternate sites to accommodate design requirements
- Environmental Impact mitigation
- Mitigation of all possible usage conflicts
- Compatibility with regional objectives
- Accessibility of site
- Economic considerations

ALTERNATIVE SIZE

- Increase or decrease project size to minimize possible impacts.
- Increase or decrease project size to correspond to community and public needs.
- Discuss implementation of a tiered approach (e.g., 5 turbines, 50 turbines, and 100 turbines).

GROWTH INDUCING ASPECTS

Describe the potential growth aspects the proposed project may have on the community and the public at large.

EXEMPT OPERATIONS

If the Applicant requires the erection of a test site, or a demonstration project, the applicant will be required to explain the necessity for such and show how it conforms to the CFR.

ADVISORY GROUPS

The applicant will be required to list an advisory group that they have established within the community, and those serving on the group. The group should include but not be limited to the following representatives commercial fisherman, recreational fisherman, recreational boaters,

local government officials, coastal regulators, environmental regulators, and any other interested parties. The group should meet four times a year and a report sent to those interested parties.

REFERENCES

APPENDICES

List of consultants or private people consulted in the preparation of this impact statement.